APPENDIX 12-A. MANUFACTURER IMPACT ANALYSIS INTERVIEW GUIDES

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APPENDIX 12-A MANUFACTURER IMPACT ANALYSIS INTERVIEW GUIDES

12-A.1 RESIDENTIAL CLOTHES DRYER MANUFACTURER IMPACT ANALYSIS INTERVIEW GUIDE

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The Department of Energy (DOE) conducts the manufacturer impact analysis (MIA) as part of the rulemaking process for amended energy conservation standards for clothes dryers. In this analysis, DOE uses publicly available information and information provided by manufacturers during interviews to assess possible impacts on manufacturers due to amended energy conservation standards.

DOE explicitly analyzes the six product classes, with the following baseline efficiencies.[1]

Table 1.1 Baseline Efficiencies for Clothes Dryer Product Classes

Product Class Number	Product Type	Product Class Description	Baseline EF* *(lb/kWh)*	Baseline Standby Power *(W)*	Baseline IEF* *(lb/kWh)*
1	**Vented Dryers**	Electric, Standard (4.4 cubic feet (ft^3) or greater capacity)	3.01	2.0	2.96
2	**Vented Dryers**	Electric, Compact (120 volts (v)) (less than 4.4 ft^3 capacity)	3.13	2.0	3.00
3	**Vented Dryers**	Electric, Compact (240 v) (less than 4.4 ft^3 capacity)	2.90	2.0	2.79
4	**Vented Dryers**	Gas	2.67	2.0	2.63
5	**Vent-less Dryers**	Electric, Compact (240 v) (less than 4.4 ft^3 capacity)	2.37	2.0	2.29
6	**Vent-less Dryers**	Electric, Combination Washer/Dryer	1.95	2.0	1.90

* The baseline Energy Factors (EFs) for vented product classes are the current minimum energy conservation standards for residential clothes dryers measured in pounds (lb) per kilowatt-hour (kWh). Baseline EFs for vent-less product classes are estimated by DOE. Integrated Energy Factor (IEF) is calculated as the clothes dryer test load weight in lb divided by the sum of “active mode” per-cycle energy use and “inactive mode” per-cycle energy use in kWh.

For each of these product classes, DOE is considering integrated efficiency levels (ELs) which also incorporate EF and standby power. DOE is currently considering six ELs for each of the electric vented clothes dryer classes and five ELs for the gas vented and both of the vent-less clothes dryer classes. In responding to this questionnaire, please refer to the ELs in the tables below.

[1] Please see http://www1.eere.energy.gov/buildings/appliance_standards/residential/preliminary_analysis.html for a complete description.

Table 1.2 Clothes Dryer Integrated Efficiency Levels – Vented Product Classes

Level	Efficiency Level Description	Integrated Efficiency Level (IEF) *(lb/kWh)*			
		Electric Standard	Electric Compact (120V)	Electric Compact (240V)	Gas
Baseline	DOE Standard + 2.0 W Standby	2.96	3.00	2.79	2.63
1	Gap Fill + 2.0 W Standby	3.04	3.08	2.86	2.71
2	Gap Fill + 2.0 W Standby	3.10	3.15	2.96	2.80
3	Gap Fill/Maximum Available + 2.0 W Standby	3.33	3.37	3.06	2.97
4	Maximum Available + 1.5 W Standby	3.35	3.41	3.10	2.98
5	Maximum Available + 0.08 W Standby	3.40	3.53	3.19	3.02
6	Heat Pump (Max Tech) + 0.08 W Standby	4.52	4.69	4.34	

Table 1.3 Clothes Dryer Integrated Efficiency Levels – Vent-less Electric Compact (240V)

Level	Efficiency Level Description	Integrated Efficiency Level (IEF) *(lb/kWh)*
		Electric Compact (240 V)
Baseline	Baseline + 2.0 W Standby	2.29
1	Baseline + 1.5 W Standby	2.31
2	Baseline + 0.08 W Standby	2.37
3	Gap Fill + 0.08 W Standby	2.39
4	Gap Fill + 0.08 W Standby	2.59
5	Heat Pump (Max-Tech) + 0.08 W Standby	3.54

Table 1.4 Clothes Dryer Integrated Efficiency Levels – Vent-less Electric Combination Washer/Dryers

Level	Efficiency Level Description	Integrated Efficiency Level (IEF) *(lb/kWh)*
		Electric Combination Washer/Dryer
Baseline	Baseline + 2.0 W Standby	1.90
1	Gap Fill + 2.0 W Standby	2.15
2	Gap Fill + 2.0 W Standby	2.34
3	Gap Fill + 1.5 W Standby	2.36
4	Gap Fill + 0.08 W Standby	2.42
5	Heat Pump (Max-Tech) + 0.08 W Standby	3.31

1 KEY ISSUES

1.1 In general, what are the key issues for your company regarding amended energy conservation standards for residential clothes dryers and this rulemaking?

1.2 Are any of the issues more or less significant for different product classes?

1.3 Do any of the issues become more significant at higher efficiency levels?

1.4 Has DOE effectively incorporated these issues in its analyses? Do have any suggestions for incorporating any of these issues into the into DOE's manufacturing impact model?

2 COMPANY OVERVIEW AND ORGANIZATIONAL CHARACTERISTICS

DOE is interested in understanding manufacturer impacts at the plant or profit center level directly pertinent to clothes dryer production. However, the context within which this profit center operates and the details of plant production are not always readily available from public sources. Understanding the organizational setting around the clothes dryer industry profit center will help DOE understand the probable future of the manufacturing activity with and without amended energy conservation standards.

2.1 Do you have a parent company, and/or any subsidiaries relevant to the clothes dryer industry?

2.2 Do you manufacture any products other than clothes dryers? If so, what other products do you manufacture? What percentage of your total manufacturing revenue corresponds to residential clothes dryers?

2.3 What percentage of your residential clothes dryer manufacturing corresponds to each product class, both in terms of revenue and shipments? Please indicate if you do not manufacture products in any given product class.

Table 2.1 Residential Clothes Dryer Revenue and Shipment Volumes by Product Class

Product Class Number	Product Type	Product Class Description	2009 Revenue	2009 Shipments
1	**Vented Dryers**	Electric, Standard (4.4 ft^3 or greater capacity)		
2	**Vented Dryers**	Electric, Compact (120 v) (less than 4.4 ft^3 capacity)		
3	**Vented Dryers**	Electric, Compact (240 v) (less than 4.4 ft^3 capacity)		
4	**Vented Dryers**	Gas		
5	**Vent-less Dryers**	Electric, Compact (240 v) (less than 4.4 ft^3 capacity)		
6	**Vent-less Dryers**	Electric, Combination Washer/Dryer		

2.4 What is your company's approximate market share in the residential clothes dryer market?

3 ENGINEERING AND LIFE-CYCLE COST ANALYSIS FOLLOW-UP

3.1 Are the incremental manufacturing costs at each efficiency level used in the Engineering Analysis and described in Chapter 5 of the preliminary TSD representative of costs your company incurs at each of these efficiency levels? If not, please provide a quantitative indication of the differences.

3.2 Do you manufacture baseline efficiency residential clothes dryers? If so, what percentage of your baseline clothes dryer shipments for each product class use electromechanical versus electronic controls?

3.3 What design changes do you expect to have to make to your baseline residential clothes dryers to meet the new UL Fire Containment/Burn Resistant Safety Requirement in UL 2158? What would be the manufacturing cost associated with these design changes? Do these costs vary by product class? How would the new UL Fire Containment/Burn Resistant Safety Requirement in UL 2158 affect the incremental manufacturing costs at higher efficiency levels (please provide a quantitative response)?

3.4 How would repair and maintenance costs be impacted by more stringent energy conservation standards? How would the frequency of repair and maintenance be affected? How would the nature of the repair and maintenance work needed change with more stringent energy conservation standards? In particular would repair and maintenance costs be impacted by energy conservation standards that would require heat pump technology?

3.5 For the automatic cycle termination technologies listed below (and any others that you may be aware of that are not listed), what is the manufacturing cost associated with each technology? How much efficiency improvement can be achieved with each of the automatic cycle termination technologies listed (please provide a quantitative indication in your response)?

- Temperature sensors with electromechanical controls
- Moisture sensors (conductivity bars w/ dedicated PCB) + temperature sensors with electromechanical controls
- Moisture sensors (conductivity bars) + temperature sensors/thermistors with electronic controls
- Moisture sensor slip ring + temperature sensors/thermistors with electronic controls

In addition, please comment on DOE's estimates for electromechanical versus electronic controls and wiring harnesses provided in the table below.

Table 3.1 Control Component Pricing Assumptions

Component Description	Estimated Prices (2009$)[2]	Manufacturer Comment
Electromechanical Control System (Timer, Switches, Face Plate)	$25.68 - $26.33	
Electromechanical Wiring Harness	$7.78 (Gas) $11.16 (Electric)	
Electronic Control System (User Interface, Fascia, Unit Control Board)	$38.60 - $46.88	
Electronic Control System Wiring Harness	$12.30 (Gas) $14.90 (Electric)	

3.6 Would you consider using outside air for the clothes dryer intake as a means to improve efficiency? If so, could you provide an estimate of the efficiency improvement associated with such an approach? Can you please explain what design changes and incremental manufacturing cost would be required to implement such a design option?

3.7 Could you provide an estimate of the efficiency improvement associated with inlet air preheat? A report by Ecos Consulting stated that with an exhaust temperature of about 110°F and a 90% efficient air-to-air counter-flow heat exchanger between the intake and exhaust, preheating of the intake air would save 1.348 kWh of heater energy, or about 40 percent of the energy consumed by the dryer.[3] Would you agree with these estimates? If not, please explain why. Is the estimated heat exchanger efficiency reasonable? If not, what efficiencies can be achieved for air-to-air heat exchangers?

3.8 Can you please comment on the following issues related to the DOE clothes washer test procedure:

3.8.a Test Cloth

How would changing the DOE clothes dryer test procedure test load from a 50/50 cotton/polyester mix to 100-percent cotton affect the measured efficiency of a baseline clothes dryer? Are these any issues with repeatability of active mode efficiency results if a 100-percent cotton load were used instead of the 50/50 cotton polyester mix? How would changing to a 100-percent cotton test load affect the measured efficiency of a clothes dryer equipped with reverse tumble? If there is an efficiency improvement, what would be the incremental manufacturing cost of incorporating reverse tumble?

3.8.b Test Load Size

Standard-Size Dryer Load Size

In comments to the preliminary energy conservation standards rulemaking analyses for residential clothes dryers, AHAM stated that the shipment-weighted residential clothes

2 Estimated prices were updated from $2008 to $2009 using the producer price index for household laundry equipment manufacturing from the Bureau of Labor Statistics (http://www.bls.gov/ppi/).

3 The 40 percent dryer energy savings is calculated based on a unit with an EF of 3.417. It is not clear from the report whether this EF was determined according to the DOE clothes dryer test procedure.

washer drum volume for standard-size products in 2008 was 3.24 cubic feet, which corresponds to an average load size of 8.15 pounds (lb). For units that you manufacture (in particular those units with baseline active mode energy factor (EF)), can you please quantify or provide any test data showing the effects on the measured EF of changing the standard-size clothes dryer test load weight in the DOE clothes dryer test procedure from 7 lb to 8.15 lb? Can you provide any test data showing the repeatability of test results using an 8.15 lb test load?

Compact-Size Dryer Load Size

In comments to the preliminary energy conservation standards rulemaking analyses for residential clothes dryers, AHAM stated that the shipment-weighted residential clothes washer drum volume for compact-size products in 2008 was 1.5 cubic feet, which corresponds to an average load size of 4.70 pounds (lb). For units that you manufacture (in particular those units with baseline active mode energy factor (EF)), can you please quantify or provide any test data showing the effects on the measured EF of changing the compact-size clothes dryer test load weight in the DOE clothes dryer test procedure from 3 lb to 4.70 lb? Can you provide any test data showing the repeatability of test results using an 4.70 lb test load?

Load Size as a Function of Dryer Capacity

Do you have, or are you aware of any, consumer usage data showing the pounds of clothes load dried per dryer cycle relative to the size of the dryer drum for residential clothes dryer use? How would matching the test load size to the drum size, as is done in the DOE clothes washer test procedure, affect the measured efficiency of residential clothes dryers that you manufacture as compared to the existing DOE clothes dryer test procedure (which specifies a 7-lb or 3-lb test load for standard or compact size clothes dryers, respectively?

3.8.c Test Load Preparation

How would changing the test load preparation in the DOE clothes dryer test procedure to specify agitating the test load in water at 60°F ± 5°F affect the measured efficiency as compared to the existing test procedure (which specifies 100°F ± 5°F)? Assuming a 7-lb test load, which would hold about 4.66 lbs of water, the energy required to heat the water from a starting temperature of 60°F to the vaporization temperature would be about 746.6 kiloJoules (kJ) (or 0.2074 kWh), whereas the energy required to heat the water from a starting temperature of 100°F to the vaporization temperature would be about 550.1 kJ (or 0.1528 kWh), resulting in a 0.0546 kWh increase in energy consumption using a starting temperature of 60°F.[4] Would this be an accurate estimate of the additional energy consumed as a result of changing the provisions for the test load preparation?

3.8.d Initial RMC

Shipment-weighted RMC data for residential clothes washers submitted by AHAM for the years 2000 through 2008 shows that the overall shipment-weighted average RMC in

4 Calculated assuming a specific heat of water, c_p, of 4.187 kJ/kg*°C.

2008 was 47 percent. For units that you manufacture (in particular those units with baseline active mode energy factor (EF)), can you please quantify or provide any test data showing the effects on the measured EF of changing the initial RMC in the DOE clothes dryer test procedure from 70 percent to 47 percent? Can you provide any test data showing the repeatability of test results using an initial RMC of 47 percent?

3.8.e Automatic Cycle Termination

For residential dryer models that you manufacture with automatic cycle termination (noting the type of sensor technology used), if the dryer is set to a normal cycle and normal (or medium) dryness level setting and allowed to run until the completion of the cycle, how would the energy consumption compare to that measured according to the existing DOE clothes dryer test procedure? How would the energy consumption and final RMC vary when using “more”, “less”, and “normal” (or medium) dryness level settings with a normal cycle?

4 MARKUPS AND PROFITABILITY

One of the primary objectives of the MIA is to assess the impact of amended energy conservation standards on industry profitability. In this section, DOE would like to understand the current markup structure of the industry and how amended energy conservation standards would impact your company’s markup structure and profitability.

DOE estimated the manufacturer production costs for the six product classes of residential clothes dryers. DOE defines manufacturer production cost as all direct costs associated with manufacturing a product: direct labor, direct materials, and overhead (which includes depreciation). The manufacturer markup is a multiplier applied to manufacturer production cost to cover non-production costs, such as SG&A and R&D, as well as profit. *It does not reflect a “profit margin.”*

The manufacturer production cost times the manufacturer markup equals the manufacturer selling price. Manufacturer selling price is the price manufacturers charge their first customers, but *does not* include additional costs along the distribution channels.

DOE estimated a baseline markup of 1.26 for residential clothes dryers.

4.1 Is the 1.26 baseline markup representative of an average industry markup?

4.2 Please comment on the baseline markups DOE calculated as compared to your company's baseline markups for the clothes dryer product classes.

Table 4.1 Residential Clothes Dryer Baseline Manufacturer Markups by Product Class

Product Class	Product Type	Product Class Description	Estimated Baseline Markup	Manufacturer Comments or Revised Estimates
1	**Vented Dryers**	Electric, Standard (4.4 ft^3 or greater capacity)	1.26	
2	**Vented Dryers**	Electric, Compact (120 v) (less than 4.4 ft^3 capacity)	1.26	
3	**Vented Dryers**	Electric, Compact (240 v) (less than 4.4 ft^3 capacity)	1.26	
4	**Vented Dryers**	Gas	1.26	
5	**Vent-less Dryers**	Electric, Compact (240 v) (less than 4.4 ft^3 capacity)	1.26	
6	**Vent-less Dryers**	Electric, Combination Washer/Dryer	1.26	

4.3 Please explain if profit levels vary by product class or product line. If yes, please indicate why.

4.4 One of the possible scenarios DOE uses to model impacts on industry profitability is the impact of commoditization of premium products. Because the market disruption caused by standards can alter the pricing of premium products, DOE is interested in understanding if efficiency is a feature that earns a premium. Within each product class, do markups vary by efficiency level? If yes, please provide information about the markups at higher efficiencies.

4.5 What factors besides efficiency affect the profitability of clothes dryers within a product class?

4.6 Does your markup change with selected design options? Is the markup on incremental costs for more efficient designs different than the markup on the baseline models (as is assumed for retailer markups used in the analyses)?

4.7 Would you expect changes in your estimated profitability following an amended energy conservation standard? If so, please explain why. Can you suggest any scenarios that would model these expected changes?

4.8 In Chapter 6 of the preliminary TSD, DOE estimated that all of the clothes dryers are purchased by consumers from retail outlets. Could you confirm whether the description of the distribution channel for clothes dryer is correct?

5 SHIPMENT PROJECTIONS

An amended energy conservation standard can change overall shipments by altering product attributes, marketing approaches, product availability, and prices. The industry revenue calculations are based on the shipment projections developed in DOE's shipments model. The shipments model includes forecasts for the base case shipments (i.e., total industry shipments absent amended energy conservation standards) and the standards case shipments (i.e., total industry shipments with amended energy conservation standards).

To determine efficiency distributions after the effective date of the standard, DOE used a "roll-up + market shift" scenario for 2014 and subsequent years. DOE assumed that product efficiencies in the base case that did not meet the standard under consideration would roll up to meet the new standard in 2014. DOE further assumed that the ENERGY STAR program would continue to promote efficient appliances after revised standards are introduced in 2014, resulting in a gradual market shift to higher efficiencies after the compliance date of the standard.

5.1 How do you think amended energy conservation standards will impact the sales of more efficient products? For example, would customers continue to buy products that exceed the energy conservation standard level? Would your response change for higher mandated efficiency levels?

5.2 DOE assumed that revised standards that increase purchase price result in reduced demand or shipments (price elasticity effect). DOE assumed an elasticity coefficient of -0.34 for all product classes, meaning a 10% increase in price would result in a 3.4% decrease in shipments. Do you agree with this assumption? How sensitive do you think shipments will be to price changes? Does it vary with product class?

5.3 The preliminary TSD provides shipments and market share by efficiency data until 2006. Could you provide updated data on shipments and market share by efficiency for the last three years? (2007-2009)

6 FINANCIAL PARAMETERS

DOE's contractor has developed a "strawman" model of the residential clothes dryer industry financial performance called the Government Regulatory Impact Model (GRIM), using publicly available data. However, this public information might not be reflective of manufacturing at the clothes dryer profit center. This section attempts to understand the financial parameters for clothes dryer manufacturing and how your company's financial situation could differ from the industry aggregate picture.

6.1 In order to accurately collect information about clothes dryer manufacturing, please compare your financial parameters to the GRIM parameters tabulated below.

Table 6.1 Financial Parameters for Residential Clothes Dryer Manufacturing

GRIM Input	Definition	Industry Estimated Value *(%)*	Your Actual (If Different from DOE's Estimate)
Income Tax Rate	Corporate effective income tax paid (percentage of earnings before taxes, EBT)	33.9	
Discount Rate	Weighted average cost of capital (inflation-adjusted weighted average of corporate cost of debt and return on equity)	7.2	
Working Capital	Current assets less current liabilities (percentage of revenues)	2.9	
Net PPE	Net plant property and equipment (percentage of revenues)	19.9	
SG&A	Selling, general, and administrative expenses (percentage of revenues)	12.5	
R&D	Research and development expenses (percentage of revenues)	2.2	
Depreciation	Amortization of fixed assets (percentage of revenues)	3.4	
Capital Expenditures	Outlay of cash to acquire or improve capital assets (percentage of revenues, not including acquisition or sale of business units)	3.5	
Cost of Goods Sold	Includes material, labor, overhead, and depreciation (percentage of revenues)	79.4	

6.2 Do any of the financial parameters in Table 6.1 change *based on product class*? Please describe any differences.

6.3 Do any of the financial parameters in Table 6.1 change for a particular *subgroup of manufacturers*? Please describe any differences.

6.4 How would you expect an amended energy conservation standard to impact any of the financial parameters for the industry?

7 CONVERSION COSTS

Amended energy conservation standards may cause your company to incur capital and product conversion costs to redesign existing products and make changes to existing production lines to be compliant with the amended energy conservation standard. Depending on their magnitude, the conversion costs can have a substantial impact on the outputs used by DOE to evaluate the industry impacts. Understanding the nature and magnitude of the conversion costs is critical portion of the MIA. The MIA considers two types of conversion costs:

- *Capital conversion costs* are one-time investments in plant, property, and equipment (PPE) necessitated by an amended energy conservation standard. These may be incremental changes to existing PPE or the replacement of existing PPE. Included are expenditures on buildings, equipment, and tooling.

- *Product conversion costs* are costs related research, product development, testing, marketing and other costs for redesigning products necessitated by an amended energy conservation standard.

DOE asks a number of questions to understand the nature and magnitude of your expected capital and product conversion costs.

7.1 Table 7.1 through Table 7.4 shows the integrated efficiency levels analyzed in the Engineering Analysis for the product categories covered by this rulemaking. The tables also show the design options used in the Engineering Analysis to reach higher efficiencies. Because DOE is using an efficiency level approach for the Engineering Analysis, the design options listed represent one possible path to reach these efficiency levels. If you would apply different design options to reach each active mode efficiency level, please describe those changes in detail.

Please provide estimates for your capital conversion costs by product class and efficiency level in Table 7.1 through Table 7.4. In the description column, DOE is interested in understanding the kinds of changes that would need to be implemented to production lines and production facilities at each efficiency level. Where applicable, please quantify the number and cost of new production equipment, molds, etc. that would be required to implement the specified design changes.

Table 7.1 Expected Capital Conversion Costs for Vented Electric Clothes Dryers

IEF Efficiency Level	Design Options	Total Capital Conversion Costs	Description
1	Switching to Open Cylinder Drum; Dedicated Heater Duct; and Change in Air Flow Patterns		
2	Design options for EL 1 + Inlet Air Pre-Heating; Moisture Sensing; and Variable Airflow		
3	Design options for EL 2 (without Inlet Air Pre-Heating) + Modulating Heat		
4	Design options for EL 3 + Switching Power Supply		
5	Design options for EL 3 + Transformerless Drop-Cap Power Supply with a Conventional Power Supply		
6	Design options for EL 2 (without Change in Air Flow Patterns and Inlet Air Pre-Heating) + Heat Pump System; Electronic Controller, Thermal and Moisture Sensing; Upgraded Airflow System; Booster Heater; and Condensate Removal + Transformerless Drop-Cap Power Supply with a Conventional Power Supply		

Table 7.2 Expected Capital Conversion Costs for Vented Gas Clothes Dryers

IEF Efficiency Level	Design Options	Total Capital Conversion Costs	Description
1	Switching to Open Cylinder Drum; Dedicated Heater Duct; and Change in Air Flow Patterns		
2	Design options for EL 1 + Inlet Air Pre-Heating; Moisture Sensing; and Variable Airflow		
3	Design options for EL 2 (without Inlet Air Pre-Heating) + Modulating Gas Valve and Controls		
4	Design options for EL 3 + Switching Power Supply		
5	Design options for EL 3 + Transformerless Drop-Cap Power Supply with a Conventional Power Supply		

Table 7.3 Expected Capital Conversion Costs for Vent-less Electric Compact (240V) Clothes Dryers

IEF Efficiency Level	Design Options	Total Capital Conversion Costs	Description
1	Switching Power Supply		
2	Transformerless Drop-Cap Power Supply with a Conventional Power Supply		
3	Design Options for EL2 + Switching to Open Cylinder Drum; and Change in Air Flow Patterns		
4	Design options for EL 3 + Modulating Heat; Moisture Sensing; and Variable Airflow		
5	Design options for EL 3, + Heat Pump System; Electronic Controller, Thermal and Moisture Sensing; Upgraded Airflow System; Booster Heater; and Condensate Removal		

Table 7.4 Expected Capital Conversion Costs for Vent-less Combination Washer Dryer

IEF Efficiency Level	Design Options	Total Capital Conversion Costs	Description
1	Automatic Cycle Termination		
2	Design options for EL 1 + Modulating Heat; Moisture Sensing; and Variable Airflow		
3	Design options for EL 2 + Switching Power Supply		
4	Design options for EL 2 + Transformerless Drop-Cap Power Supply with a Conventional Power Supply		
5	Design options for EL 1+ Heat Pump System; Electronic Controller, Thermal and Moisture Sensing; Upgraded Airflow System; Booster Heater; and Condensate Removal + Transformerless Drop-Cap Power Supply with a Conventional Power Supply		

7.2 Would the changes in question 7.1 be similar across all of your production lines and factories for each product class?

7.3 At your manufacturing facilities, would the design options for each efficiency level be difficult to implement? If so, would your company modify the existing facility or develop a new facility?

7.4 Are there certain efficiency levels that would require relatively minor changes to existing products? Are there certain efficiency levels where the capital or product conversion costs significantly increase over the previous efficiency levels? Would your answer change for different product classes? Please describe these changes qualitatively.

7.5 For each of the product categories shown in Table 7.1 through Table 7.4, which efficiency level changes could be made within existing platform designs and which would result in major product redesigns?

7.6 What level of product conversion costs would you expect to incur for each of these design changes for each product class? Please provide your estimates in Table 7.5 through Table 7.8 considering such expenses as product development expenses, prototyping, testing, certification, and marketing. In the description column, please describe the assumptions behind the estimates provided.

Table 7.5 Expected Product Conversion Costs for Vented Electric Clothes Dryers

IEF Efficiency Level	Design Options	Total Product Conversion Costs	Description
1	Switching to Open Cylinder Drum; Dedicated Heater Duct; and Change in Air Flow Patterns		
2	Design options for EL 1 + Inlet Air Pre-Heating; Moisture Sensing; and Variable Airflow		
3	Design options for EL 2 (without Inlet Air Pre-Heating) + Modulating Heat		
4	Design options for EL 3 + Switching Power Supply		
5	Design options for EL 3 + Transformerless Drop-Cap Power Supply with a Conventional Power Supply		
6	Design options for EL 2 (without Change in Air Flow Patterns and Inlet Air Pre-Heating) + Heat Pump System; Electronic Controller, Thermal and Moisture Sensing; Upgraded Airflow System; Booster Heater; and Condensate Removal + Transformerless Drop-Cap Power Supply with a Conventional Power Supply		

Table 7.6 Expected Product Conversion Costs for Vented Gas Clothes Dryers

IEF Efficiency Level	Design Options	Total Product Conversion Costs	Description
1	Switching to Open Cylinder Drum; Dedicated Heater Duct; and Change in Air Flow Patterns		
2	Design options for EL 1 + Inlet Air Pre-Heating; Moisture Sensing; and Variable Airflow		
3	Design options for EL 2 (without Inlet Air Pre-Heating) + Modulating Gas Valve and Controls		
4	Design options for EL 3 + Switching Power Supply		
5	Design options for EL 3 + Transformerless Drop-Cap Power Supply with a Conventional Power Supply		

Table 7.7 Expected Product Conversion Costs for Vent-less Electric Compact (240V) Clothes Dryers

IEF Efficiency Level	Design Options	Total Product Conversion Costs	Description
1	Switching Power Supply		
2	Transformerless Drop-Cap Power Supply with a Conventional Power Supply		
3	Design Options for EL2 + Switching to Open Cylinder Drum; and Change in Air Flow Patterns		
4	Design options for EL 3 + Modulating Heat; Moisture Sensing; and Variable Airflow		
5	Design options for EL 3, + Heat Pump System; Electronic Controller, Thermal and Moisture Sensing; Upgraded Airflow System; Booster Heater; and Condensate Removal		

Table 7.8 Expected Product Conversion Costs for Vent-less Combination Washer Dryer

IEF Efficiency Level	Design Options	Total Capital Conversion Costs	Description
1	Automatic Cycle Termination		
2	Design options for EL 1 + Modulating Heat; Moisture Sensing; and Variable Airflow		
3	Design options for EL 2 + Switching Power Supply		
4	Design options for EL 2 + Transformerless Drop-Cap Power Supply with a Conventional Power Supply		
5	Design options for EL 1+ Heat Pump System; Electronic Controller, Thermal and Moisture Sensing; Upgraded Airflow System; Booster Heater; and Condensate Removal + Transformerless Drop-Cap Power Supply with a Conventional Power Supply		

7.7 Please provide additional qualitative information to help DOE understand the types and nature of your investments, including the plant and tooling changes and the product development effort required at different efficiency levels.

8 CUMULATIVE REGULATORY BURDEN

Cumulative regulatory burden refers to the burden that industry faces from overlapping effects of new or revised DOE standards and/or other regulatory actions affecting the same product or industry.

8.1 In the preliminary analysis and in written comments, the UL Safety Regulation 2158 was highlighted as a major concern for manufacturers. Have you had any r&d expenditures related to complying with this regulation? What r&d, product development, and testing expenses will be required to make your residential clothes dryer compliant? Do you expect to incur any capital expenses to make your products comply? Will any of these changes be coordinated with the changes required by this rulemaking?

8.2 Below is a list of the other relevant regulations that could affect manufacturers of residential clothes dryers. Please provide any comments on the listed regulations and provide an estimate for your expected compliance cost.

Table 8.1 Other Regulations Identified by DOE

Regulation	Estimated or Actual Effective Date(s)	Comments	Expected Expense for Compliance
UL Safety Regulation 2158			
Residential Clothes Washer Energy Conservation Standard			
HCFC Phase-Out			

8.3 Are there any other recent or impending regulations that residential clothes dryer manufacturers face (from DOE or otherwise)? If so, please identify the regulation, the corresponding effective dates, and your expected compliance cost.

8.4 Under what circumstances would you be able to coordinate any expenditure related to these other regulations with an amended energy conservation standard?

9 DIRECT EMPLOYMENT IMPACT ASSESSMENT

The impact of amended energy conservation standards on employment is an important consideration in the rulemaking process. This section of the interview guide seeks to explore current trends in residential clothes dryer manufacturer employment and solicit manufacturer views on how domestic employment patterns might be affected by amended energy conservation standards.

9.1 Where are your residential clothes dryer facilities that produce products for the United States located? What types of products are manufactured at each location? Please provide annual shipment figures for your company's residential clothes dryer manufacturing at each location by product class. Please also provide employment levels at each of these facilities.

Table 9.1 Residential Clothes Dryer Revenue and Shipment Volumes by Product Class

Facility	Location	Product Types Manufactured	Employees	Annual Shipments
Example	*Jackson, TN*	*Vented gas dryers, standard electric vented dryers*	*650*	*300,000 for vented gas; 100,000 for electric vented*
1				
2				
3				
4				
5				

9.2 Would your domestic employment levels be expected to change significantly under amended energy conservation standards? If so, please explain how they would change if higher efficiency levels are required.

9.3 Would the workforce skills necessary under amended energy conservation standards require extensive retraining or replacement of employees at your manufacturing facilities?

9.4 Would amended energy conservation standards require extensive retraining of your service/field technicians? If so, could you expand on how your service infrastructure would be impacted in general as a result of amended energy conservation standards?

10 MANUFACTURING CAPACITY AND NON-US SALES

10.1 How would amended energy conservation standards impact your company's manufacturing capacity?

10.2 For any design changes that would require new production equipment, please describe how much downtime would be required. What impact would downtime have on your business? Are there any design changes that could not be implemented before the compliance date of the final rule for certain product classes?

10.3 What percentage of your company's residential clothes dryer **sales** are made within the United States?

10.4 What percentage of your residential clothes dryers are **produced** in the United States?

10.5 What percentage of your U.S. production of residential clothes dryers is exported?

10.6 Are there any foreign companies with North American production facilities?

10.7 Would amended energy conservation standards impact your domestic vs. foreign manufacturing or sourcing decisions? Is there an efficiency level that would cause you to move exiting domestic production facilities outside the U.S.?

11 IMPACT ON COMPETITION

Amended energy conservation standards can alter the competitive dynamics of the market. This can include prompting companies to enter or exit the market, or to merge. DOE and the Department of Justice are both interested in any potential reduction in competition that would result from an amended energy conservation standard.

11.1 How would amended energy conservation standards affect your ability to compete in the marketplace? Would the effects on your company be different than others in the industry?

11.2 Would you expect your market share to change if amended energy conservation standards become effective?

11.3 Do any firms hold intellectual property that gives them a competitive advantage following amended energy conservation standards?

11.4 How would industry competition change as a result of amended energy conservation standards?

12 IMPACTS ON SMALL BUSINESS

12.1 The Small Business Administration (SBA) denotes a small business in the residential clothes dryer manufacturing industry as having less than 1,000 total employees, including the parent company and all subsidiaries.[5] By this definition, is your company considered a small business?

12.2 Are there any reasons that a small business manufacturer might be at a disadvantage relative to a larger business under amended energy conservation standards? Please consider such factors as technical expertise, access to capital, bulk purchasing power for materials/components, engineering resources, and any other relevant issues.

12.3 To your knowledge, are there any **small businesses** for which the adoption of amended energy conservation standards would have a particularly severe impact? If so, why?

12.4 To your knowledge, are there any **niche manufacturers** or **component manufacturers** for which the adoption of amended energy conservation standards would have a particularly severe impact? If so, why?

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[5] DOE uses the small business size standards published on August 22, 2008, as amended, by the SBA to determine whether a company is a small business. To be categorized as a small business, a household laundry equipment manufacturer (which includes residential clothes dryer manufacturers) and its affiliates may employ a maximum of 1,000 employees. The 1,000 employee threshold includes all employees in a business's parent company and any other subsidiaries.

12-A.2 ROOM AIR CONDITIONER MANUFACTURER IMPACT ANALYSIS INTERVIEW GUIDE

April 20, 2010

The Department of Energy (DOE) conducts the manufacturer impact analysis (MIA) as part of the rulemaking process for amended energy conservation standards for room air conditioners. In this analysis, DOE uses publicly available information and information provided by manufacturers during interviews to assess possible impacts on manufacturers due to amended energy conservation standards.

DOE explicitly analyzes the four product classes in the table below. DOE is currently considering between three and five efficiency levels (ELs) for each product class that correspond to percentage improvements over the existing standards. In responding to this questionnaire, please refer to the efficiency levels in the table below. DOE explains how it intends to determine the minimum efficiencies for the remaining product classes in the engineering chapter of the technical support document.[6]

Baseline Efficiencies for Analyzed Product Classes

Product Class Number	Product Type	Product Class Description	Baseline EER (Btu/h – W)	Baseline IEER* (Btu/h – W)
1	**Without reverse cycle and with louvered sides**	Less than 6,000 Btu/h	9.70	9.52
3	**Without reverse cycle and with louvered sides**	8,000 Btu/h to 13,999 Btu/h	9.80	9.71
5	**Without reverse cycle and with louvered sides**	20,000 Btu/h or more	8.50	8.47
8	**Without reverse cycle and without louvered sides**	8,000 Btu/h to 13,999 Btu/h	8.50	8.43

Btu/h = British thermal units per hour
* These definitions are based on testing according to the current energy test procedure for EER plus a baseline standby power measurement of 1.4 W to reach the combined IEER measurement. DOE expects to propose revisions to the current room air conditioner test procedure to account for this and other changes.

Efficiency Levels Under Consideration

	IEER (EER)*				
Product Class Number	**EL 1**	**EL 2**	**EL 3**	**EL 4**	**EL 5**
1	10.1 (10.3)	10.6 (10.7)	11.1 (11.2)	11.6 (11.7)	12.0 (12.1)
3	10.3 (10.4)	10.8 (10.9)	11.3 (11.4)	11.5 (11.6)	N/A
5	9.0 (9.0)	9.4 (9.4)	9.8 (9.8)	10.0 (10.0)	N/A
8	8.9 (9.0)	9.3 (9.4)	9.8 (9.9)	N/A	N/A

*EER levels are for reference, efficiency levels are being considered in IEER

[6] Please see http://www1.eere.energy.gov/buildings/appliance_standards/residential/preliminary_analysis.html for a complete description.

1 KEY ISSUES

1.5 In general, what are the key issues for your company regarding amended energy conservation standards for room air conditioners and this rulemaking?

1.6 Are any of the issues more or less significant for different product classes?

1.7 Do any of the issues become more significant at higher efficiency levels, such as Energy Star levels?

1.8 Has DOE effectively incorporated these issues in its analyses? Do you have any suggestions for incorporating these issues into DOE's manufacturing impact model?

2 COMPANY OVERVIEW AND ORGANIZATIONAL CHARACTERISTICS

DOE is interested in understanding manufacturer impacts at the plant or profit center level directly pertinent to room air conditioner production. However, the context within which the plant operates and the details of plant production and costs are not always readily available from public sources. Therefore, DOE invites you to provide these details confidentially in your own words to the extent possible and practical. Understanding the organizational setting around the room air conditioner industry profit center will help DOE understand the probable future of the manufacturing activity with and without amended energy conservation standards.

2.1 Do you have a parent company, and/or any subsidiaries relevant to the room air conditioner industry?

2.2 Do you manufacture any products other than room air conditioners? If so, what other products do you manufacture? What percentage of your total manufacturing revenue corresponds to room air conditioners?

2.3 What product classes of room air conditioners do you manufacturer? (See Table 2.1 below for descriptions of certain product classes, and list any additional product classes.)

2.4 What percentage of your room air conditioner manufacturing corresponds to each product class, both in terms of revenue and shipments? Please indicate if you do not manufacturer products in any given product class.

Table 2.1 Room Air Conditioner Revenue and Shipment Volumes by Product Class

Product Class	Product Type	Product Class Description	2009 Revenue	2009 Shipments
1	**Without reverse cycle and with louvered sides**	Less than 6,000 Btu/h		
2	**Without reverse cycle and with louvered sides**	6,000 Btu/h to 7,999 Btu/h		
3	**Without reverse cycle and with louvered sides**	8,000 Btu/h to 13,999 Btu/h		
4	**Without reverse cycle and with louvered sides**	14,000 Btu/h to 19,999 Btu/h		
5	**Without reverse cycle and with louvered sides**	20,000 Btu/h or more		
8	**Without reverse cycle and without louvered sides**	8,000 Btu/h to 13,999 Btu/h		
16	**Casement-Slider**	-		
All Other Product Classes				

2.5 What is your company's approximate market share by product class in the room air conditioners market?

2.6 In Chapter 6 of the preliminary TSD, DOE estimated that all of the room air conditioners are purchased by consumers from retail outlets. Do you agree with this assessment of the distribution channel for room air conditioners?

3 ENGINEERING AND LIFE CYCLE COST ANALYSIS FOLLOW-UP

3.1 For the products directly analyzed for the Engineering Analysis that represent the bulk of room air conditioner sales, can you comment on the progressive use of design options for achieving the successively higher efficiency levels (compared with the design option information presented by efficiency level in Appendix 5D of the preliminary TSD)?

3.2 Are the incremental design option costs used in the Engineering Analysis and described in Chapter 5 of the preliminary TSD representative of costs your company pays for these design options? If not, please provide a quantitative indication of the differences.

3.3 Please comment on the interpolated and extrapolated cost-efficiency curves developed for the product classes not directly analyzed. This process is described in the TSD in Chapter 5, but summarized as follows:

- PC 2 and 4 based on interpolation by capacity based on PC 1, 3, and 5.

- PC 6 and 7 using extrapolation of PC 8 results to lower capacities based on PC 1 and 3 results.
- PC 9 and 10 using extrapolation of PC 8 results to higher capacity based on PC 3 and 5 results for design options not requiring package size increase.
- PC 11 and 13 based on interpolation of PC 1, 3, and 5 results, assuming that presence of the reversing feature, while impacting efficiency, would not have a greater impact on efficiency at higher efficiency levels.
- PC 12 and 14 based on similar interpolation of PC 6 through 10 results.
- PC 15 and 16 based on results for PC3, with limitation to design options such that only modest package size increase is allowed.

3.4 Please comment on the maximum available EER of 12.0. Is this EER the highest EER available using R-410A?

3.5 Please comment on current package sizes for R-410A units and how they compare to package sizes for R-22 units.

3.6 Please comment on the package sizes used to achieve higher efficiency levels in the TSD What data or information can you provide that will support arguments regarding limitations of maximum package growth, including impacts on consumer utility?

Design Description	**Width** *(inches (in))*	**Height** *(in)*	**Depth** *(in)*	**Weight** *(lb)*
Product Class 1				
Baseline	15.5	11.75	12	38.6
First Size Increase	18.5	12.5	14	42.7
Second Size Increase	19.69	13.63	17.72	46.8
Product Class 3, 8,000 Btu/h				
Baseline	18.5	12.5	15.5	49.4
First Size Increase	19.3	15.63	18	55.7
Second Size Increase	22.5	15.63	23.6	63.6
Product Class 3, 12,000 Btu/h				
Baseline	23.63	15	22.25	76.5
First Size Increase	24.63	17.5	22.25	81.2
Second Size Increase	26.38	17.5	26.75	87.6
Product Class 5				
Baseline	26	17.69	28.41	129.2
First Size Increase	27.75	17.94	30.94	136.4
Second Size Increase	29.81	22.38	30.94	156.5

3.7 Please comment on the current efficiency of R-410A rotary compressors. Is the maximum EER of R-410A rotary compressors 10 EER?

3.8 Please comment on the conversion costs of switching from R-22 refrigerant to R-410 refrigerant. Do the costs shown below reflect your company's total incremental costs?

Product Class	Total Costs Due to Refrigerant Switch
PC 1	$3.92
PC 3 (8,000 Btu/h Capacity)	$5.47
PC 3 (12,000 Btu/h Capacity)	$7.49
PC 5	$13.70
PC 8 (8,000 Btu/h Capacity)	$5.77
PC 8 (12,000 Btu/h Capacity)	$7.95

3.9 Please comment on the efficiency impact of switching to R-410A refrigerant. Is there a 10% drop in overall unit efficiency? How have you addressed this impact (larger units, more efficient components)?

3.10 How would repair and maintenance costs be impacted by more stringent energy conservation standards? How would the frequency of repair and maintenance be affected? How would the nature of the repair and maintenance work needed change with more stringent energy conservation standards?

4 MARKUPS AND PROFITABILITY

One of the primary objectives of the MIA is to assess the impact of amended energy conservation standards on industry profitability. In this section, DOE would like to understand the current markup structure of the industry and how amended energy conservation standards would impact your company's markup structure and profitability.

DOE estimated the manufacturer production costs for four product classes of room air conditioners. DOE defines manufacturer production cost as all direct costs associated with manufacturing a product: direct labor, direct materials, and overhead (which includes depreciation). The manufacturer markup is a multiplier applied to manufacturer production cost to cover non-production costs, such as SG&A and R&D, as well as profit. It does not reflect a "profit margin."

The manufacturer production cost times the manufacturer markup equals the manufacturer selling price. Manufacturer selling price is the price manufacturers charge their first customers, but does not include additional costs along the distribution channels.

DOE estimated a baseline markup of 1.26 for room air conditioners.

4.1 Is the 1.26 baseline markup representative of an average industry markup?

4.2 Please comment on the baseline markups DOE calculated as compared to your company's baseline markups for the room air conditioner product classes.

Table 4.1 Room Air Conditioner Baseline Manufacturer Markups by Product Class

Product Class	Product Type	Product Class Description	Baseline Markup	Manufacturer Comments or Revised Estimates
1	**Without reverse cycle and with louvered sides**	Less than 6,000 Btu/h	1.26	
3	**Without reverse cycle and with louvered sides**	8,000 Btu/h to 13,999 Btu/h	1.26	
5	**Without reverse cycle and with louvered sides**	20,000 Btu/h or more	1.26	
8	**Without reverse cycle and without louvered sides**	8,000 Btu/h to 13,999 Btu/h	1.26	

4.3 Please explain if profit levels vary by product class or product line. If yes, please indicate why.

4.4 Because the market disruption caused by standards can alter the pricing of premium products, DOE is interested in understanding how margins currently change with efficiency. Within each product class, do markups vary by efficiency level? If yes, please provide information about the markups at higher efficiencies, such as Energy Star.

4.5 What factors besides efficiency affect the profitability of room air conditioners within a product class?

4.6 Does your markup change with selected design options? Is the markup on incremental costs for more efficient designs different than the markup on the baseline models (as is assumed for retailer markups used in the analyses)?

4.7 Would you expect changes in your estimated profitability following an amended energy conservation standard? If so, please explain why. Can you suggest any scenarios that would model these expected changes?

5 SHIPMENT PROJECTIONS

An amended energy conservation standard can change overall shipments by altering product attributes, marketing approaches, product availability, and prices. The industry revenue calculations are based on the shipment projections developed in DOE's shipments model. The shipments model includes forecasts for the base case shipments (i.e., total industry shipments absent amended energy conservation standards) and the standards case shipments (i.e., total industry shipments with amended energy conservation standards).

To determine efficiency distributions after the effective date of the standard, DOE used a "roll-up" scenario for 2014 and subsequent years. DOE assumed that product efficiencies in the base case that did not meet the standard under consideration would roll up to meet the new standard in 2014.

5.1 How do you think amended energy conservation standards will impact the sales of more efficient products? For example, would customers continue to buy products that exceed the energy conservation standard level? What would occur to the split of sales of Energy Star vs. non-Energy Star units? Would your response change for higher mandated efficiency levels?

5.2 DOE assumed that revised standards that increase purchase price result in reduced demand or shipments (price elasticity effect). DOE assumed an elasticity coefficient of -0.34, meaning a 10% increase in price would result in a 3.4% decrease in shipments. Do you agree with this assumption? How sensitive do you think shipments will be to price changes? Does it vary with product class?

5.3 The preliminary TSD provides shipments and market share by efficiency data until 2007. Could you provide updated data on shipments and market share by efficiency for 2008 and 2009?

6 FINANCIAL PARAMETERS

DOE's contractor has developed a "strawman" model of the room air conditioners industry financial performance called the Government Regulatory Impact Model (GRIM) using publicly available data. However, this public information might not be reflective of manufacturing at the room air conditioners profit center. This section attempts to understand the financial parameters for room air conditioner manufacturing and how your company's financial situation could differ from the industry aggregate picture.

6.1 In order to accurately collect information about room air conditioner manufacturing, please compare your financial parameters to the GRIM parameters tabulated below.

Table 6.1 Financial Parameters for Room Air Conditioner Manufacturers

GRIM Input	Definition	Industry Estimated Value	Your Actual (If Significantly Different from DOE's Estimate)
Income Tax Rate	Corporate effective income tax paid (percentage of earnings before taxes, EBT)	33.9	
Discount Rate	Weighted average cost of capital (inflation-adjusted weighted average of corporate cost of debt and return on equity)	7.2	
Working Capital	Current assets less current liabilities (percentage of revenues)	2.9	
Net PPE	Net plant property and equipment (percentage of revenues)	19.9	
SG&A	Selling, general, and administrative expenses (percentage of revenues)	12.5	
R&D	Research and development expenses (percentage of revenues)	2.2	
Depreciation	Amortization of fixed assets (percentage of revenues)	3.4	
Capital Expenditures	Outlay of cash to acquire or improve capital assets (percentage of revenues, not including acquisition or sale of business units)	3.5	
Cost of Goods Sold	Includes material, labor, overhead, and depreciation (percentage of revenues)	79.4	

6.2 Do any of the financial parameters in Table 6.1 change *based on product class*? Please describe any differences.

6.3 Do any of the financial parameters in Table 6.1 change for a particular *subgroup of manufacturers*? Please describe any differences.

6.4 How would you expect an amended energy conservation standard to impact any of the financial parameters for the industry?

7 CONVERSION COSTS

Amended energy conservation standards may cause your company to incur capital and product conversion costs to redesign existing products and make changes to existing production lines to be compliant with the amended energy conservation standard. Depending on their magnitude, the conversion costs can have a substantial impact on the outputs used by DOE to evaluate the industry impacts. Understanding the nature and magnitude of the conversion costs is a critical portion of the MIA. The MIA considers two types of conversion costs:

- *Capital conversion costs are one-time investments in plant, property, and equipment (PPE) necessitated by an amended energy conservation standard. These may be incremental changes to existing PPE or the replacement of existing PPE. Included are expenditures on buildings, equipment, and tooling.*

- *Product conversion costs are costs related to research, product development, testing, marketing and other costs for redesigning products necessitated by an amended energy conservation standard.*

Table 7.1 shows the design options used to research higher efficiencies for the major product categories covered by this rulemaking. DOE asks a number of questions to understand the nature and magnitude of your expected capital and product conversion costs. Please refer to Table 7.1 when considering your response to the following questions.

Table 7.1 Design Options Used to Improve Efficiency for each Analyzed Product Class

Product Class Number	Design Options
1	Add subcooler, increase evaporator circuits, increase evaporator width, increase chassis size, stand-by reduction, increase heat exchanger tube ODs, increase PSC efficiency, DC brushless motor
3	Increase evaporator width, increase evaporator tube OD, add subcooler, increase chassis size, stand-by reduction, increase PSC efficiency, DC brushless motor
5	Add subcooler, increase chassis size, standby increase, increase PSC efficiency, scroll compressor, DC brushless motor
8	Increase evaporator width, add subcooler, increase condenser width with coil bend, standby increase, increase PSC efficiency, increase evaporator tube OD, increase condenser tube OD, DC brushless motor

7.1 At your manufacturing facilities, would these design options be difficult to implement? If so, would your company modify the existing facility or develop a new facility?

7.2 Are there certain design options that would require relatively minor changes to existing products? Are there certain efficiency levels where the capital or product conversion costs significantly increase over the previous efficiency levels? Would your answer change for different product classes? Please describe these changes qualitatively.

7.3 For each of the product classes shown in Table 7.1, which design options could be made within existing platform designs and which would result in major product redesigns?

7.4 Please provide estimates for your capital conversion costs by product class in Table 7.2 through Table 7.5 below. In the description column, DOE is interested in understanding the kinds of changes that would need to be implemented to production lines and production facilities at each efficiency level. Where applicable, please quantify the number and cost of new production equipment, molds, foaming fixtures, etc. that would be required to implement the specified design changes.

Table 7.2 Expected Capital Conversion Costs for Product Class 1

Efficiency Level (IEER)	Pathway of Design Options You Would Take	Total Capital Conversion Costs	Description of Expected Capital Requirements
EL 1 (10.1)			
EL 2 (10.6)			
EL 3 (11.1)			
EL 4 (11.6)			
EL 5 (12.0)			

Table 7.3 Expected Capital Conversion Costs for Product Class 3

Efficiency Level (IEER)	Pathway of Design Options You Would Take	Total Capital Conversion Costs	Description of Expected Capital Requirements
EL 1 (10.3)			
EL 2 (10.8)			
EL 3 (11.3)			
EL 4 (11.5)			

Table 7.4 Expected Capital Conversion Costs for Product Class 5

Efficiency Level (IEER)	Pathway of Design Options You Would Take	Total Capital Conversion Costs	Description of Expected Capital Requirements
EL 1 (9.0)			
EL 2 (9.4)			
EL 3 (9.8)			
EL 4 (10.0)			

Table 7.5 Expected Capital Conversion Costs for Product Class 8

Efficiency Level (IEER)	Pathway of Design Options You Would Take	Total Capital Conversion Costs	Description of Expected Capital Requirements
EL 1 (8.9)			
EL 2 (9.3)			
EL 3 (9.8)			

7.5 Would the changes in 7.4 be similar across all of your production lines and factories for each product class?

7.6 What level of product development and other product conversion costs would you expect to incur for each of these design changes for each product class? Please provide your estimates in Table 7.6 through Table 7.9 below considering such expenses as product development expenses, prototyping, testing, certification, and marketing. In the description column, please describe the assumptions behind the estimates provided.

Table 7.6 Expected Product Conversion Costs for Product Class 1

Efficiency Level (IEER)	Pathway of Design Options You Would Take	Total Product Conversion Costs	Description of Expected Development Requirements
EL 1 (10.1)			
EL 2 (10.6)			
EL 3 (11.1)			
EL 4 (11.6)			
EL 5 (12.0)			

Table 7.7 Expected Product Conversion Costs for Product Class 3

Efficiency Level (IEER)	Pathway of Design Options You Would Take	Total Product Conversion Costs	Description of Expected Development Requirements
EL 1 (10.3)			
EL 2 (10.8)			
EL 3 (11.3)			
EL 4 (11.5)			

Table 7.8 Expected Product Conversion Costs for Product Class 5

Efficiency Level (IEER)	Pathway of Design Options You Would Take	Total Product Conversion Costs	Description of Expected Development Requirements
EL 1 (9.0)			
EL 2 (9.4)			
EL 3 (9.8)			
EL 4 (10.0)			

Table 7.9 Expected Product Conversion Costs for Product Class 8

Efficiency Level (IEER)	Pathway of Design Options You Would Take	Total Product Conversion Costs	Description of Expected Development Requirements
EL 1 (8.9)			
EL 2 (9.3)			
EL 3 (9.8)			

7.7 Please provide additional qualitative information to help DOE understand the types and nature of your investments, including the plant and tooling changes and the product development effort required at different efficiency levels.

8 CUMULATIVE REGULATORY BURDEN

Cumulative regulatory burden refers to the burden that industry faces from overlapping effects of new or revised DOE standards and/or other regulatory actions affecting the same product or industry.

8.1 Below is a list of regulations that could affect manufacturers of room air conditioners. Please provide any comments on the listed regulations and provide an estimate for your expected compliance cost.

Table 8.1 Other Regulations Identified by DOE

Regulation	Estimated or Actual Effective Date(s)	Expected Expense for Compliance	Comments
DOE's Energy Conservation Standards for Other Products and Equipment			
International Energy-Efficiency Standards			
EPA Phase-Out of HCFC-22	2010		

8.2 Are there any other recent or impending regulations that room air conditioner manufacturers face (from DOE or otherwise)? If so, please identify the regulation, the corresponding effective dates, and your expected compliance cost.

8.3 Under what circumstances would you be able to coordinate any expenditure related to these other regulations with an amended energy conservation standard?

8.4 DOE research has not identified any production tax credits for manufacturers of room air conditioners. Do you know of any current or future tax credits or other benefits available to your company for manufacturing more efficient room air conditioners? If so, please describe.

9 DIRECT EMPLOYMENT IMPACT ASSESSMENT

The impact of amended energy conservation standards on employment is an important consideration in the rulemaking process. This section of the interview guide seeks to explore current trends in room air conditioner employment and solicit manufacturer views on how domestic employment patterns might be affected by amended energy conservation standards.

9.1 Where are your room air conditioner facilities that produce products for the United States located? What types of products are manufactured at each location? Please provide annual shipment figures for your company's room air conditioner manufacturing at each location by product class. Please also provide employment levels at each of these facilities.

9.2 Would your domestic employment levels be expected to change significantly under amended energy conservation standards? If so, please explain how they would change if higher efficiency levels are required.

9.3 Would the workforce skills necessary under amended energy conservation standards require extensive retraining or replacement of employees at your manufacturing facilities?

9.4 Would amended energy conservation standards require extensive retraining of your service/field technicians? If so, could you expand on how your service infrastructure would be impacted in general as a result of amended energy conservation standards?

10 MANUFACTURING CAPACITY AND NON-US SALES

10.1 How would amended energy conservation standards impact your company's manufacturing capacity?

10.2 For any design changes that would require new production equipment, please describe how much downtime would be required. What impact would downtime have on your business? Are there any design changes that could not be implemented before the compliance date of the final rule for certain product classes?

10.3 What percentage of your company's room air conditioner **sales** are made within the United States?

10.4 What percentage of your room air conditioner sales are **produced** in the United States?

10.5 What percentage of your U.S. production of room air conditioners is exported?

10.6 Are there any foreign companies with North American production facilities?

10.7 Would amended energy conservation standards impact your domestic vs. foreign manufacturing or sourcing decisions? Is there an efficiency level that would cause you to move exiting domestic production facilities outside the U.S.?

11 IMPACT ON COMPETITION

Amended energy conservation standards can alter the competitive dynamics of the market. This can include prompting companies to enter or exit the market, or to merge. DOE and the Department of Justice are both interested in any potential reduction in competition that would result from an amended energy conservation standard.

11.1 How would amended energy conservation standards affect your ability to compete in the marketplace? Would the effects on your company be different than others in the industry?

11.2 Would you expect your market share to change if amended energy conservation standards become effective?

11.3 Do any firms hold intellectual property that gives them a competitive advantage following amended energy conservation standards?

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12.1 The Small Business Administration (SBA) denotes a small business in the room air conditioner manufacturing industry as having less than 750 total employees, including the parent company and all subsidiaries.[7] By this definition, is your company considered a small business?

12.2 Are there any reasons that a small business manufacturer might be at a disadvantage relative to a larger business under amended energy conservation standards? Please consider such factors as technical expertise, access to capital, bulk purchasing power for materials/components, engineering resources, and any other relevant issues.

12.3 To your knowledge, are there any **small businesses** for which the adoption of amended energy conservation standards would have a particularly severe impact? If so, why?

12.4 To your knowledge, are there any **niche manufacturers** or **component manufacturers** for which the adoption of amended energy conservation standards would have a particularly severe impact? If so, why?

[7] DOE uses the small business size standards published on August 22, 2008, as amended, by the SBA to determine whether a company is a small business. To be categorized as a small business, an air conditioning and warm air heating equipment manufacturer or a commercial and industrial refrigeration equipment manufacturer and its affiliates may employ a maximum of 750 employees. The 750 employee threshold includes all employees in a business's parent company and any other subsidiaries.